an existing commercial reactor had the potential to be the lowest cost option and indicated confusion as to whether purchase of a commercial reactor or irradiation services from a privately owned reactor were treated as reasonable alternatives capable of meeting long-term tritium requirements. These comments and concerns prompted the Department to issue a Federal Register announcement on August 25, 1995 (60 FR 44327) in which the Department reopened the comment period for 21 days regarding its intention to treat both the purchase of irradiation services and the purchase of an existing or partially completed reactor as reasonable alternatives for long-term tritium supply. The Department summarized all comments received from both comment periods, prepared responses to the summaries, made revisions to the PEIS based on the comments, and identified its preferred alternative. The Notice of Availability of the Final Programmatic Environmental Impact Statement was published in the Federal Register on October 27, 1995 (60 FR 55021).

Comments have been received since the Notice of Availability was published asserting that there are errors in the analysis of cost, schedule and production assurance, especially regarding a new large Advanced Light Water Reactor. Comments were also received regarding the multipurpose reactor concept, and the use of the Fast Flux Test Facility at the Department's Hanford site to produce tritium. These comments are addressed in a subsequent section of this Record of Decision.

Alternatives Considered

Proposed Action: The Department of Energy proposes to provide tritium supply and recycling facilities for the Nation's Nuclear Weapons Complex. Tritium, a radioactive isotope of hydrogen, is produced in nature, but in very small amounts. Therefore, since it is an essential component of every warhead in the current and projected U.S. nuclear weapons stockpile, the amounts required must be man-made. Tritium decays at a rate of approximately 5.5 percent per year and must be replaced periodically as long as the Nation relies on a nuclear deterrent. Currently, the Department does not have the capability to produce the required amounts of tritium. The Department needs a capability that can produce tritium to meet the requirements set forth in the 1994 Nuclear Weapons Stockpile Plan, the latest official guidance. These requirements have been defined as a steady-state mode of 3/16 of the goal amount previously established for a nuclear reactor under the Department's New Production Reactors (NPR) program. The tritium supply source should also be capable of producing 3/8 of NPR goal amount if necessary either to eliminate inventory shortfalls or to support a larger stockpile size. The Department is currently meeting tritium requirements for the stockpile by utilizing tritium recycled from dismantled weapons. Ratification of the START II Protocol would mean that new tritium would be required by approximately 2011. The ability to meet an earlier date, if stockpile requirements should change, was also analyzed.

New tritium would be supplied, in either a reactor or accelerator, by irradiating target materials with neutrons and subsequently extracting the tritium in pure form for its use in nuclear weapons. The tritium recycling process consists of recovering residual tritium from weapons components, purifying it, and refilling weapons components with pure tritium. The Department's tritium recycle facilities are located at the Savannah River Site (SRS) near Aiken, SC.

Four technology alternatives were evaluated for a new supply facility—a heavy water reactor, an advanced light water reactor—both large (1,300 MWe) and small (600 MWe); a modular high temperature gas-cooled reactor; and a linear accelerator. Emerging design options for the heavy water reactor and the modular high temperature gas-cooled reactor were also reviewed. The advanced light water reactor and modular high temperature gas-cooled reactor alternatives were also evaluated as to the potential use of fuel fabricated from plutonium excess to weapons program requirements while simultaneously producing tritium and electricity (the so-called ''multipurpose reactor''). Five sites were evaluated for a new facility—the Idaho National Engineering Laboratory (INEL), near Idaho Falls, ID; the Nevada Test Site (NTS), near Las Vegas, NV; the Oak Ridge Reservation (ORR), Oak Ridge, TN; the Pantex Plant (Pantex), Amarillo, TX; and SRS. The Department also evaluated the use of existing commercial light water reactors, either through purchase of an existing or partially completed reactor that would be converted for the production of tritium or through purchase of irradiation services from a privately owned reactor. The purchase of an existing or partially completed reactor would allow the Department, should it choose to do so, to implement the multipurpose reactor concept. Such use is evaluated in the Final PEIS and the Technical Reference Report. Additionally, in accordance with CEQ regulations, the no action alternative (not providing a new supply of tritium) was evaluated.

Tritium recycling alternatives evaluated included no action (utilizing existing facilities at the Savannah River Site with no upgrades or consolidation), consolidation and upgrading of the existing facilities, or construction of new recycling facilities to be collocated with a new tritium supply facility if the Savannah River Site were not chosen as the site for a new tritium supply facility. The consolidation and upgrading of the Savannah River Site recycling facilities would support either a new tritium supply facility (if constructed at the Savannah River Site) or the use of an existing commercial reactor (if a commercial reactor were ultimately selected as a long-term tritium supply source or became necessary as a contingency source of tritium). In addition, a new tritium extraction facility would be constructed at the Savannah River Site.

Tritium Supply Technology Alternatives

This section describes each of the alternatives. The size of the facilities, land area requirements, and construction and operation workforces are presented.

1. *No Action:* No Action is presented for comparison with the action alternatives. Under No Action, the Department would not establish a new tritium supply capability, the current inventory of tritium would decay, and the Department would eventually not meet stockpile requirements for tritium.

Construct and Operate New Facilities

2. *Accelerator Production of Tritium (APT):* An APT would accelerate a proton beam in a long tunnel toward one of two target/blanket assemblies located in separate target stations. Such an accelerator would be approximately 4,000 feet in length and would be housed in a concrete tunnel buried 40 to 50 feet underground. It would require approximately 550 MWe of electricity during peak production periods (to meet the 3/8 requirement) and 355 MWe to produce the steady-state requirement (to meet the 3/16 requirement) of tritium. In addition to the accelerator, the facility would include a klystron manufacturing and remanufacturing building as well as waste treatment, maintenance, operation, and administrative buildings, and a security infrastructure. Two target types are being analyzed, a helium-3 target which uses helium-3 gas to make tritium or a spallation-induced lithium